

THURSDAY, AUGUST 31, 1876

PHYSICAL SCIENCE IN SCHOOLS

AT a meeting of the British Association five years ago, the subject of science teaching in our higher schools excited unusual interest. Not only were papers read and followed by enthusiastic discussion, but a committee was privately formed, including more than twenty leaders of the association, all of whom undertook to combine in pressing the claims of science on our head-masters, and in offering counsel as to systems and methods, apparatus, and expenditure. Technical difficulties prevented the formal nomination of the committee in that year; and before the next meeting came round the Science Commission was in full work, and the ground was covered. Five years have passed; the Commission has reported; and the British Association, if it deals at all with the problem that lies at the root of our scientific progress, will have to face the fact that only ten endowed schools in England give as much as four hours a week to the study of science; in other words, that in spite of ten years of talk, the *éclat* of a Royal Commission, a complete consensus of scientific authority, and the loud demands of less educated but not less keen-sighted public opinion, the organisation and practical working of science in our higher schools has scarcely advanced a step since the Schools Inquiry Commission reported in 1868.

Are the causes of this strange paralysis discoverable, and are they capable of present remedy? We believe that they are notorious, and that it is in the power of the British Association at the present moment to overrule them. It is therefore in the hope of rekindling a productive enthusiasm at a critical moment in the history of our science teaching that we appeal with all the earnestness of which we are capable to the leaders of the great parliament, whose session will have opened before this day week.

The first obstacle to be understood and reckoned with, is the amazing confusion in the minds of unscientific leaders of opinion as to the very nature of education. An ex-Lord Chancellor gives away prizes to a school, declares in stately terms that Greek and Latin must always form the backbone of high intellectual training, and that the sciences can only be tolerated as a sort of ornament or capital to this great central vertebral column. On the following day an ex-Chancellor of the Exchequer gives away prizes at another school, assures the boys that modern scientific teaching is their being's end and aim, and envies them by comparison with himself, who at Winchester and Oxford basked only in the "*clarum antiquæ lucis jubar*." In all such public utterances chaos reigns supreme. Men take side with one or other branch of mental discipline, unconscious of the Nemesis which waits on the divorce of literature from science, or of science from literature, forgetful of the fundamental truths that all minds require general training up to a certain point, and that the period at which special education should supervene is the problem which awaits solution.

The hostility of the clergy ranks high among the difficulties we have to recognise. To the great public schools

this is matter of indifference; but the vigorous head-master of a young and rising county school, who attempts, being himself a clergyman, to make real science compulsory in his school, is rattened by the vulgar heresy-hunters, who swarm in every diocese. The hint and shrug in society, the whisper at clerical conferences, the warning to parents attracted by the school against "atheistic tendencies," keep down his numbers and wear out his energies, till his enterprise becomes a warning instead of an example to his admirers at other schools. In a neighbourhood of rural squires and clergy, untempered by a large town's neighbourhood, and unchecked by any man of education and intelligence holding sovereignty by virtue of superior rank and wealth, a school which treads doggedly in the ancient paths and is flavoured with gentle "High Church tendencies," will certainly succeed even in second-rate hands, while a school which under superior chieftainship asserts the claims of science, and whose theology is therefore suspect, will as certainly long struggle for existence, if it does not finally succumb.

The head-masters, with no inveterate intention, but by the force of circumstances, are potent allies upon the side of nescience. Their position is peculiar. Enlightened, able, high-minded, and most laborious, to speak of them with disrespect would be to forfeit claim to a hearing. But of their whole number not more than two or three know anything at all of science; they have gained honours and supremacy by proficiency in other subjects; to teach well these subjects which they know, forms their happiness and satisfies their sense of duty; and they feel natural dismay at the proposal to force upon them new and untried work which they have not knowledge to supervise, and which must displace whole departments of classical study. Bifurcation they do not mind, for they hope that the dunces will be drafted into the modern school, and the clever boys retained upon the classical side; but the momentous recommendation of the Royal Commission that six hours a week of science teaching should be given to every boy in every school has taken away their breath; it was only once alluded to at the last head-masters' meeting, and then with something between a protest and a sneer. They are too clear-sighted not to see that the demand for science teaching is real, and too liberal not readily to accede to it, if some central authority, which they respect, at once puts pressure on them, and tenders such assistance and advice as they can trust. But, until these two things are done, they will pursue a policy of inaction.

Nor is there any hope that this reluctance of head-masters will be stimulated by exuberant energy on the part of governing bodies. The instances in which these pet creations of the Endowed Schools Commission have appeared before the public hitherto, make it evident that absolute inactivity is the service they are best calculated to render to the cause of education; but their probable devotion to science may be guessed from an incident reported in our columns some months ago, where a body of trustees, composed of country gentlemen of local mark, having to arrange a competitive examination under a scheme of the Charity Commission, adopted the machinery of the University Leaving Examination, but inserted a distinct proviso that no scientific subject recognised by the University Regulations should under any circum-

stances be taken up by the candidates, either as an alternative or a positive branch of work.

Will the Universities help or impede the spread of school science teaching? The Universities adhere at present to their fatal principle that only one-sided knowledge shall find favour within their walls. A boy who knows nothing but classics, nothing but mathematics, nothing but science, may easily win a scholarship; a boy who knows all three must seek distinction elsewhere; and this rule shapes inevitably the teaching of the schools. The science scholarships at Oxford, of which we hear so much, fall mainly to three distinguished schools; two so large and wealthy that they can overpower most competitors by their expenditure on staff and apparatus, the third planted in Oxford, with access to the University museum and laboratory, and with a pick of teachers from the men of whom examiners are made; and these schools ensure success in science by abandoning other subjects almost or altogether in the case of the candidates they send up. No school which should carry out the recommendations of the Commissioners, by giving six hours a week to science, and the rest of its time to literature and mathematics; no school which should realise its function as bound to develop young minds by strengthening in fair proportion all their faculties of imagination, reason, memory, and observation, could offer boys for any sort of scholarship under the present University system with the faintest chance of success.

What these institutions are powerful to avert or helpless to bring about is, we repeat, within the scope of the British Association to effect. All institutions, political or educational, will bow to a strongly formed committee of scientific men, formally commissioned by the Association and speaking with authority, delegated as well as personal, on scientific subjects. Let such a Committee be revived as died on paper in 1871, including the acknowledged leaders of pure science, and weighted with the names of such educationalists as have shown themselves zealous for science teaching. Let their functions be—first, to communicate with the head-masters and governing bodies, calling attention to the recommendations of the Duke of Devonshire's Commission, asking how far and how soon each school is prepared to carry these out, and tendering advice, should it be desired, on any details as to selection and sequence of subjects, teachers, text-books, outlay. Secondly, let them appeal to the Universities, to which many of them belong, as to the bearing of science scholarships and fellowships upon school teaching, and the extent to which such influence may be modified or ameliorated in that re-arrangement of College funds which next session will probably be commenced. Thirdly, let them be instructed to watch the action of Government in any proposal made either in pursuance of Lord Salisbury's bill, or as giving effect to the Duke of Devonshire's Commission, and let them be known to hold a brief for school science in reference to all such legislation. A single meeting of such a committee before the Association separates would settle a basis of action and compress itself into a working sub-committee. The time for papers and discussions is past; they have done their work. What the schools and the head-masters want is authoritative guidance; the guidance not only of a blue-book, but of a living leader-

ship, central, commanding, and accessible, to which they may look with confidence, and bow without loss of prestige.

The precision of its dicta will clear up public confusion; its ability, conscientiousness, and popularity will overawe the clergy; schools and universities will listen respectfully to suggestions echoed by their own best men; and the three great departments of intellectual culture, equal in credit, appliances, and teaching power, will bring out all the faculties, and elicit the special aptitudes of every English boy.

"Hinc omne principium, huc refer exitum!"

HANBURY'S REMAINS

Science Papers; chiefly Pharmacological and Botanical.

By Daniel Hanbury, F.R.S., &c. Edited, with Memoir, by Joseph Ince. (London: Macmillan and Co., 1876.)

A NOT inconsiderable contingent to the army of workers in science has been furnished by London trade. The ranks of our geologists, zoologists, and biologists, have been recruited to a larger extent than many might suppose from city counting-houses. But one would still hardly expect to find the same wholesale chemist's shop in an obscure court out of Lombard Street send forth, in two successive generations, two Fellows to the Royal Society. Except, however, in their common love of science, Daniel Hanbury was a very different man from William Allen, the druggist and Quaker preacher, the lecturer on chemistry and intercessor on behalf of the rights of conscience with almost all the "crowned heads" of Europe.¹ Retaining through life a warm attachment to the religious body in which he was born, Hanbury's religion was nevertheless of the closet rather than the forum; few of his friends ever heard him speak on religious subjects; and anything in the shape of proselytising was altogether alien to his mental constitution. Essentially a specialist, he was at the same time, what the best specialist must always be, an educated gentleman.

From the time when, as a very young man, he contributed his first essays to the *Transactions* of the Pharmaceutical Society, till his death at the early age of forty-nine, when a long career of usefulness seemed to be before him, the object to which Hanbury set himself was the clearing up of uncertain or disputed points regarding the botanical origin of drugs known to the pharmacopœias of this and other countries. Notwithstanding what he and fellow-workers on the Continent have done, it is surprising to find in how great obscurity the history is still involved of many medicinal substances which are daily prescribed by physicians and dispensed by druggists. The larger portion of the present volume is occupied with papers bearing on questions of this nature; those which will probably be found of the greatest value to posterity are:—"On the Different Kinds of Cardamom used in Commerce," "On Liquid and Solid Storax," "On the Source of Balsam of Peru," "Historical Notes on the *Radix galangæ* of Pharmacy," and "On the Determination of *Parvira brava*."

Hanbury's inquiries were characterised, above all things, by extreme thoroughness. No amount of research,

¹ Mr. Luke Howard, F.R.S., the eminent meteorologist, was also, for a short time, a partner with Allen.